APPLICATON NOTE: 301

## Monitoring –80°C or Cryogenic Freezers

Many biological samples stored in freezers with temperatures below –80°C are irreplaceable and must be protected and stored for many years or even in perpetuity. They should be constantly monitored and alarmed for protection.

Although -80 freezers are normally very reliable, it is possible for them to have problems. Recognizing this, many regulatory and certifying agencies now require that freezers be monitored twenty-four hours a day, seven days a week and be equipped with an alert device that will warn them if the temperature rises.

Chart recorders and data loggers have been used in the past but they each have drawbacks that make them a less than ideal solution. Chart recorders require frequent maintenance and data loggers do not have a visual display so the data
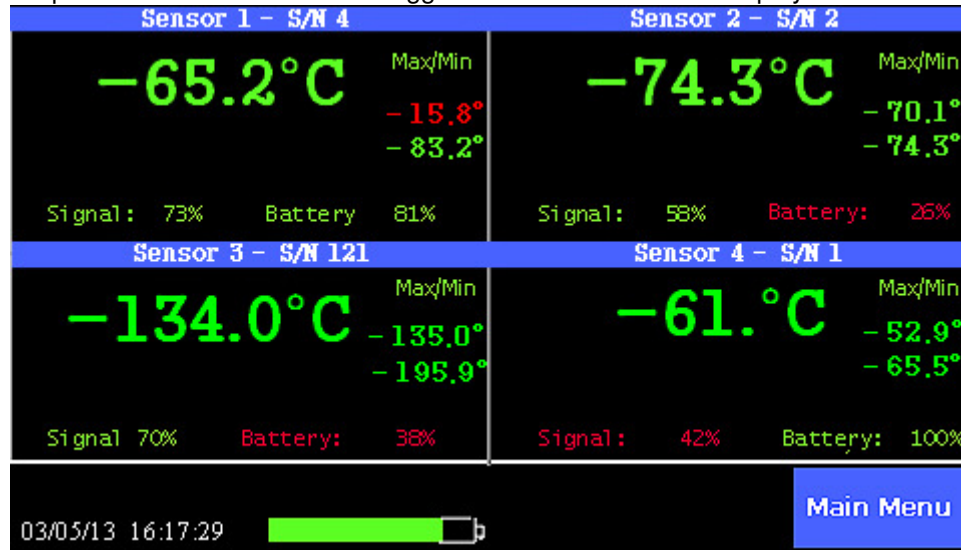
is not visible to the very people who can prevent problems.

Our TV2 Easy Freezer Alarm is an ideal instrument for monitoring and documenting –80°C freezers. **It is accurate and automatic.** It not only shows the current temperature, the max and min recorded, but also and a temperature history chart of conditions

over a 1.5 year period for up to four different freezers or refrigerators. it also has a relay to trigger an alarm or auto dialer in the event of an emergency.

No special training is required to read or interpret the chart, which means that anyone that comes near the Easy Freezer Alarm will automatically get a quick update on the condition of the freezers.

Using an Easy Freezer Alarm is simple, with minimum set-up time required. It needs no programming, maintenance, paper or pens.

What to Order:

- TV2 — Display only, relay & software — $ 679.00
  Add one, two, three or four sensors
- WS4HTC — Stainless steel sensor — $ 279.00
  Optional Items
- APD-10 (Auto-dialer with cable) — $ 249.00
- AV15 Local Alarm — $ 50.00

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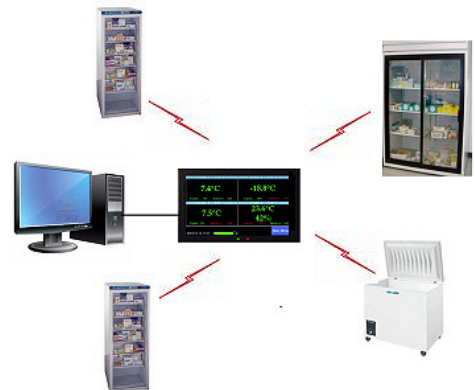
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Installation and Setup

Mount the TV2 Easy Freezer Alarm in a convenient place. Ideally it can be in the office area near a computer but it does not need to plug into a computer. It could be in a hallway or right near the freezers themselves. Place the batteries into the sensors and position them in the freezers to be monitored.

The following are some suggested settings.

Sensor 1 setup: Thermocouple	Sensor 1 setup: Thermocouple
Serial # xxxxxxxxxx Calibrated 05/21/10 Sample data once every 0:10:00 HHMMSS Thermocouple type: k Type of averaging med Maximum temperature line -20 Minimum temperature line -100	Serial # xxxxxxxxxx Calibrated 05/21/10 Sample data once every 0:10:00 HHMMSS Thermocouple type: k Type of averaging med Maximum temperature line -20 Minimum temperature line -100

Note: The easy freezer alarm actually takes a sample every few seconds and stores the average of the samples at whatever interval you select. You will filter out the drastic temperature swings that can occur when the door is opened if the averaging is set to 'med'. If the averaging is set to slow and someone has opened the door for several minutes the actual air temperature of the freezer could be above freezing. This reading would not accurately reflect the temperature of the stored contents however. So setting the averaging to **med** buffers the temperature swings that can occur from normal use of the freezer during the day.

Alarm Menu	Alarm Menu
Sensor 1 Thermocouple Relay: Enabled Trigger relay of 9:00 MM:SS If temp > -50℃ for 00:20:00 HH:MM:SS If temp < -100℃ for 00:10:00 HH:MM:SS	Sensor 2 Thermocouple Relay: Enabled Trigger relay of 9:00 MM:SS If temp > -50℃ for 00:20:00 HH:MM:SS If temp < -100℃ for 00:10:00 HH:MM:SS

The alarm temperatures are set independently of the displayed temperature chart limits.

Downloading data:
The Easy Freezer Alarm will hold more than 1.5 years of temperature data for each sensor with the settings listed above. This data can be downloaded automatically if the TV2 is plugged into your computer or it can be downloaded whenever you need to backup the data or print out a chart.

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[1] Enabling the alarm will insure that the internal alarm is triggered as well as the external relay.

## Optional Auto-Dialer

The ThermaViewer comes equipped with a dry-contact relay that can be used to trigger an alarm or auto dialer. Each sensor has its own high and low trigger point. With the setting above, the relay will be closed and the internal alarm will ring for 9 minutes, if the temperature rises above -50°C for more than 20 minutes or falls below –100°C for more than 10 minutes.

Once the relay has been triggered the alarm will stop if the temperature falls back within your safe limits or the trigger time elapses, or someone presses the "ESC" key. Then in this example the temperature will have to rise above -50°C for more than 20 minutes or fall below –100°C for more than 9 minutes before the relay will be triggered again.

If you need faster response time you should change the settings listed above.

The auto dialer will call four phone numbers (i.e. phone, pager, answering machine or service) and leave a message when triggered by the ThermaViewer. It will keep calling the four numbers until someone picks up at each number and the message is delivered.

Thermocouple sensor #2

Thermocouple sensor #1

Phone line
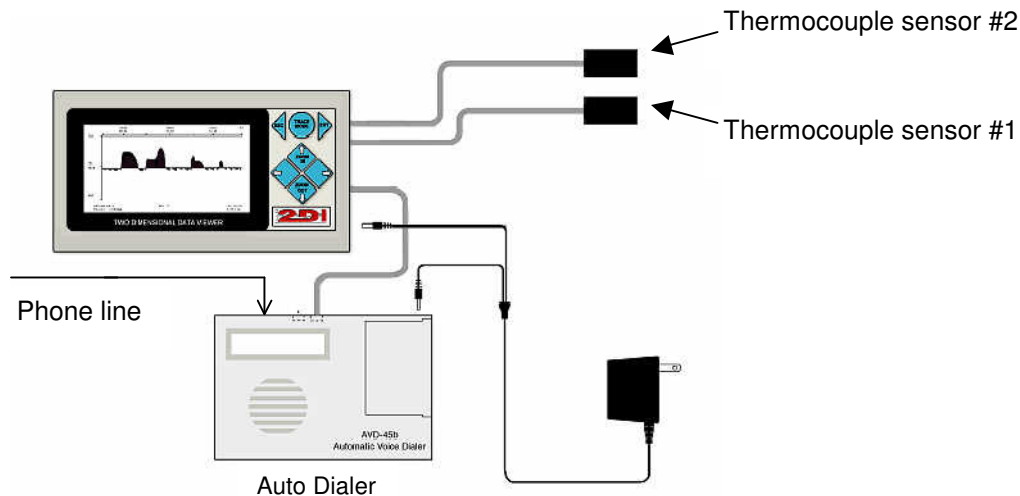
Auto Dialer

The auto dialer should be set as follows:
        No exit delay
        No entry delay
        N.O. (meaning that the relay is normally open).
        MOM (meaning that it only takes a momentary activation from the relay to trigger the dialer).

A relay test function on the System Parameter of the ThermaViewer causes the relay to be immediately triggered. Entering 'yes' in this field causes the ThermaViewer to trigger the auto dialer to call the four phone numbers stored in its memory after a 20 second delay. Allow 90 seconds to elapse between the time you exit the programming mode of the auto dialer and you activate the relay.

Technical support for Auto Dialer only (858) 413-0149